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Integrated Coastal Zone Management in the Venice Area A Methodological Framework

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SUMMARY

Recent years have seen an increasing consensus on the Integrated Coastal Zone Management (ICZM) principles and structure, and the widespread recognition of its effectiveness in dealing with multiples and interconnected coastal issues. A successful ICZM programme adjusted to a specific context will incorporate systems of governance, culture and tradition, needs and expectations and will be built as much as possible on existing organisation and arrangements. This paper aims at defining the methodological basis for an ICZM framework suitable for an operational application in the socio-economic and environmental context of the Venetian area. The first section of the paper defines the basic concepts involved in coastal planning. The second section reviews methodological requirements and constraints. In the third section the paper analyses the procedure, the stages and steps within those stages that are generally necessary to implement ICZM programmes. Finally, the conclusive remarks identify further research requirements that will contribute to a concrete proposal for the Venice Lagoon System.

Keywords: Coastal planning, sustainable development, policy, integrated management, methodology

JEL: O20, Q01, Q20

NON TECHNICAL SUMMARY

Integrated Coastal Zone Management is not a mere juxtaposition of marine issues and land-based issues but is rather a process that recognises the distinctive character of the coastal area and the mutual influence of land and sea. In recent years ***Integrated Coastal Zone Management***, has emerged as the most appropriate process for dealing with current and long term coastal problems (e.g. IPCC, 1996, WCC'1993) allowing integration across geographic boundaries, sectors and disciplines, political and institutional boundaries.

Over the 30 years of history, the maturation of the ICZM concept through considerable international efforts to define ICZM features has led to a consensus about the general model and framework of ICZM. However, common difficulties in transforming the ICZM objectives into effective actions may result from the limits of understanding about coastal processes and the complex web of interrelations in coastal systems. In addition a large range of approaches are available and diverse institutional arrangements can be applied and tailored to specific decisional contexts and types of governance. There is a recognised need for defining methodological approaches developed and designed to respond to the complexity of coastal management issues, and to problems linked to the information flows.

This paper aims at defining the methodological base for a framework that can be used as a blue print to develop local initiatives in the Venetian territory. The first section of the paper defines the basic concepts involved in coastal planning. The second section reviews methodological requirements and constraints. In the third section the paper analyses the procedure and the iterative cycle of activities outputs, decisions, and feedback that are generally necessary to implement ICZM programmes. Starting with the analysis of the triggering factors and the prerequisites for a good start, the paper identifies the stages and steps common to the majority of integrated coastal management frameworks. The general ICZM structure includes five main stages: (1) Inception, (2) problem identification (3) planning, (4) implementation, and (5) evaluation. These stages are described along with guidelines and indicators for a successful programme orientation. Finally, the conclusive remarks identify research requirements that will further a concrete proposal for the Venice Lagoon System.

CONTENTS

1. Introduction

The lack of effective integrated management in coastal areas and particularly the lack of national legislation has been recognised at the European level as one of the main factors responsible for the degradation of coastal and marine environments (EUCC, 1999; EC, 1999; EC, 1999b). Experience gained during the European Integrated Coastal Zone Management (ICZM) Demonstration Programme (EC,1999b; EC,2000) underlines the fact that there is no single correct approach or framework for coastal management and the sustainable allocation of coastal resources. As a consequence there is a recognised need to define suitable methodological approaches to implement the general principles of ICZM to any specific location and context. Many recent studies have addressed these issues in different parts of the world (es. WCC, 1993; Sorensen, J. 1997; Cicin-Sain and Knecht, 1998).

In 1999 FEEM launched a new research project called "Integrated Coastal Zone Management in the Venice area - A pilot study for the Sant'Erasmo Island". The need for such a project rose from current debate related to the problem of high vulnerability of the Venice Lagoon ecosystem and to possible measures to cope with it: planning, resource management, projects, interventions, etc.
Existing institutional and administrative structures are complex and fragmented with responsibilities distributed between several official bodies involved in the management of the Venice area. This organisational framework together with the lack of relevant quantitative data related to the coastal system, highlighted the benefits of considering the problem in the context of Integrated Coastal Zone Management (ICZM).

The project encompasses two main research lines (figure 1):

- analysis of procedures and methods used in case studies and situations similar to the Venice lagoon (*external elements*);
- analysis of the local situation and efforts to tailor ICZM procedure to the Venetian context and in particular in the pilot study on the Sant'Erasmo Island (*local case*) .

The two research lines are designed to produce a general framework including the definition of criteria and indications for the implementation of the ICZM procedure in a specific context. An important aspect of the project is the identification of possible approaches for the application of ICZM principles (from a planning perspective) to specific projects aimed at preserving the Venetian coastal area. In particular the ongoing engineering schemes including public works to improve Venice's defences against high water events, have a planning relevance in term of costs and expected results. In addition they reflect an engineering vision of Venice's problems that will be compared to the ICZM model.

The capacity of ICZM to face the socio-economic challenges of coastal planning on a small scale will be tested, thus contributing to the identification of needs for future action on the larger scale of the whole Venetian Lagoon. To this end, the project is thus designed to:

- gain a better understanding of the legal, political and administrative context;
- identify potential conflicts of interest among coastal zone users;
- identify problems of co-ordination between stakeholders and decision-makers at various levels and appropriate techniques and tools for public participation and conflict resolution;
- define the needs and the opportunities for ICZM;
- identify information gaps and propose future research and methods to fill these gaps;
- contribute to the elaboration of action plans at the local level; and
- develop a local demonstrative experience as a guiding methodological ICZM model;

In recent years considerable international efforts aimed at defining the ICZM characteristics have lead to a consensus about the general structure of the ICZM model, and a large quantity of literature and practical experiences (Cicin-Sain and Knecht, 1998). The paper aims at defining the methodological basis for an ICZM framework suitable for an operational application in the socio-economic and environmental context of the Venetian area. A review of existing methodological proposals, together with a simplified ICZM procedure is presented in the paper by examining typical stages, decisions and expected outputs, and some guidelines for a successful implementation. The ICZM procedure is developed bearing in mind the specificity of the Venetian area with particular attention to existing on-going programme of public works for the safeguarding of the Lagoon.

2. Coastal Areas and Decision Making: definitions and concepts

Coasts are unique natural heritage with irreplaceable ecological, cultural and economic resources. These spaces function as protective corridors of land and water and concentrate population, economic activities, and resources in a complex environment to be described with a systemic approach. ***Coastal spaces*** can be seen as a dynamic, unpredictable and interdependent set of subsystems in which the land-sea interactions are at the origin of very specific environments such as wetlands, estuaries, and open seas areas.

The ***coastal area*** is commonly defined as a geographic space of transition between land and sea, which has not been defined as a zone (Barg, U.C 1995). Such areas generally include:

- *inland areas***,** which affect the oceans mainly via rivers and non-point sources of pollution;
- *coastal lands*—wetlands;
- *coastal waters* (estuaries, lagoons, and shallow waters);
- *offshore waters*, mainly out to the edge of national jurisdiction (200 nautical-miles offshore);
- *high seas*, beyond the limit of national jurisdiction.

The ***coastal zone*** does not have a rigid definition and the delimitation of its boundaries in a given area (*zoning)* varies according to political and administrative considerations. The main components of coastal systems, natural processes and human activities, interact in these spaces in a complex manner, forming a so called *eco-socio-system* (Henocques *et al*., 1997) (figure 1) in which the dynamic nature and the productivity are vital for economic well-being and development in many countries. In the last decades the combination of increasing human and natural pressures have resulted in jeopardised coastal areas in terms of their ecological integrity, and regions at risk in terms of socio-economic welfare.

Decision making for coastal area management implies dealing with uncertain conditions related to variations in socio-economic parameters (demand on coastal resources, demography, technological progress, etc.) and environmental factors (geomorphologic changes, ecological processes, climate change, etc.). Traditional methods of coastal planning have shown limitations in managing this uncertainty and the complexity of choices surrounding an appropriate and rational use of coastal resources. The intrinsic dynamic nature of coastal spaces has been largely ignored by traditional approaches, together with a narrowed vision of problems due to sectoral management practices. The result is decades of uncoordinated management and inappropriate decision making.

The term "***coastal management***" came into common use with the implementation of the United States Coastal Zone Management Act of 1972. The act recognised that a new coastal management approach was needed. Since then, it has been widely recognised that a simple juxtaposition of sectoral approaches to management and land use planning is not appropriate to guarantee the

sustainable use of natural resources. Coastal areas require specific management approaches involving a system of relationships among actors who operate directly or indirectly in the coastal zones:

1) people who live, use, or are concerned otherwise (in their beliefs or behaviours) with the coastal environment,
2) policy makers and managers whose decisions and actions affect the behaviour of coastal people, and members of the scientific community: (natural scientists and social scientists) (figure 2).

Integrated Coastal Zone Management[1] after 30-years of history, has emerged as the most appropriate process for dealing with current and long term coastal problems (e.g IPCC, 1996; WCC, 1993; EC, 1999). ICZM is a "*process of governance and consists of the legal and institutional framework necessary to ensure that development and management plans are integrated with environmental goals and are made with the participation of all affected*"(Post and Ludin, 1996). ICZM is based on the underlying concept of ***sustainable development*** [2]**.**

ICZM objectives include:

- ❒ to maximise economic and social benefits derived from the use of coastal zone resources;
- ❒ to minimise conflicts (provide conflict resolution mechanisms) and the harmful effects of activities on resources, on the environment and upon each other;
- ❒ to stimulate and guide the sustainable development of coastal regions;
- ❒ to facilitate integrated decision making through a continuous decision support process.

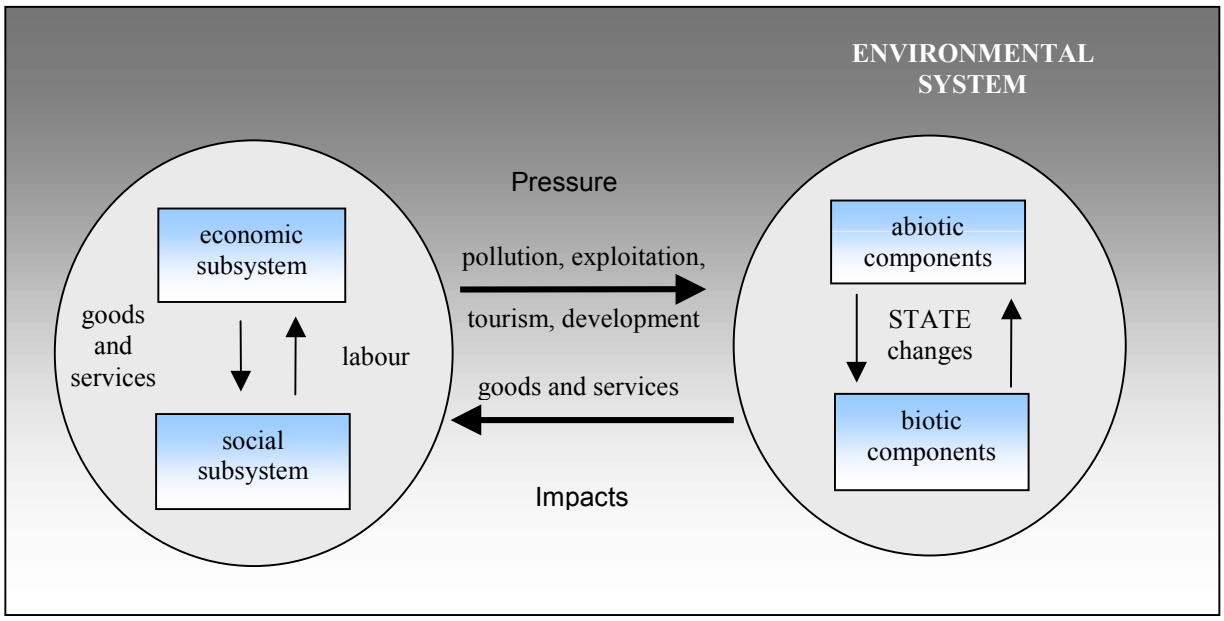


Figure 1: Components and interactions of the coastal *ecosociosystem* (adapted from Sawart and Bakkes, 1995).

[1] Other terms can be found in the literature to refer to the sustainable use and allocation of coastal resources. That includes: Integrated Coastal Management (ICM), Integrated Coastal Area Management (ICAM), Integrated Coastal Area Planning (ICAP), Sustainable Coastal Resources Management, etc.

[2] In the ICZM context, the concept of sustainable development implies that the present use of the marine environment and its resources shall not compromise the use and the enjoyment of that environment and its resources by future generations (GESAMP, 1990).

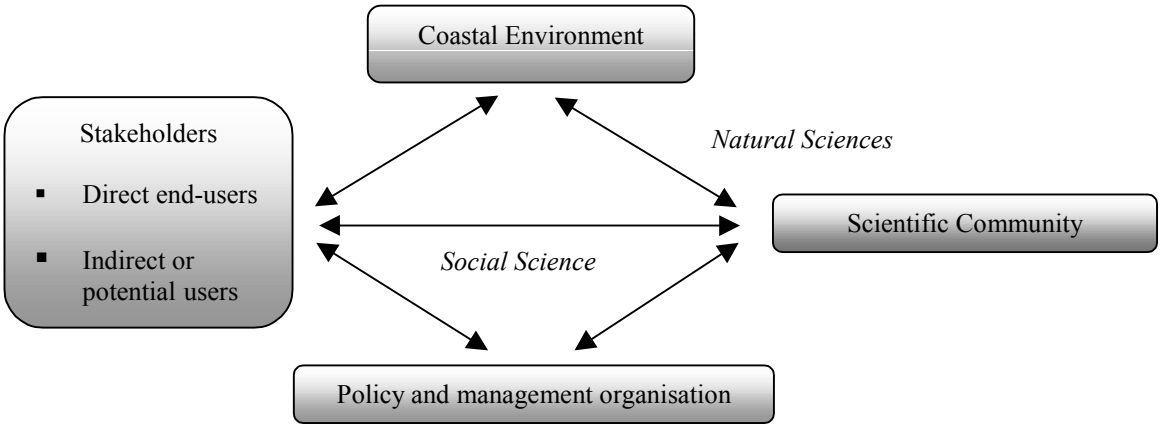


Figure 2: Interrelations in the coastal management system (from Orbach, 1995).

ICZM is a concept that refers to a holistic view of human and natural interactions on the littoral approaching the management of component sectors as part of a functional whole (figure 3). Experiences show that overall benefits from addressing and managing sectoral issues simultaneously are greater than pursuing sector-driven development plans (Pernetta and Elder, 1993; Scialabba, 1998). ICZM is not designed to replace specialised sectoral management but rather to harmonise and complement it (Cicin-Sain and Knecht, 1998). Moreover, ICZM aims at strengthening institutional and legal frameworks and implementing issue-driven action plans through the co-ordinated application of a series of case-specific elements:

- set of principles;
- set of measures (structural, institutional, economical, legal, financial);
- set of mechanisms (for linking responsible agencies and organisations, for public involvement);
- set of technological tools and instruments (information systems, cost-benefit analyses, scientific models, surveys, environmental impact assessments, etc.).

3. From concepts to practice

The 1990s have seen an explosion of interest and experimentation in ICZM due to the decisive impulse of outcomes from the Rio conference and particularly the publication of Agenda 21 in 1992. Chapter 17 remains one of the most important reference texts for coastal environments. Since then a large number of strategies and plans have been prepared, reviewed and revised at various spatial scales, dealing with diverse management issues. Nevertheless the number of examples in which mechanisms of ICZM have been successfully established in institutional structures remains limited. Most initiatives focus on preparatory activities rather than on concrete implementation phases and monitoring.

There are generally difficulties in transforming the ICZM objectives into effective actions. These difficulties may result from a limited understanding about natural processes and interrelation webs in coastal systems. Methodologies have been developed and designed to respond to the complexity of coastal management issues, and to problems linked to the management and the exchange of information flows. Various documents such as guidelines, good practice reports and codes of

conduct have been elaborated and published as methodological tools by major international organisations (FAO, OCDE, UNEP, World Bank) in order to help in identifying the steps, and elaborating appropriate frameworks for coastal management. Two documents are of particular relevance for their methodological dimension:

- *The Methodological Guide to Integrated Management* carried out for the Intergovernmental Oceanographic Commission (Henocque *et al*, 1997)
- *The Regional Seas report and Studies on Guidelines for Integrated Coastal and Marine Areas* carried out by the UNEP (1995).

The first document deals with the problems of gathering, managing and organising data and information and aims at helping the decision making process. The second is a comprehensive document for the elaboration and the implementation of ICZM with a particular reference to the regional seas.

Any methodological approach faces a series of general problems common to the management of coastal zones, which can be grouped into three categories (from Henocque *et al,* 1997):

1. Problems linked to the direct impact of human activities, in particular the quality of the environment (water, sediments, living organisms), the natural integrity of coastal ecosystems, hydrosystems and landscape, the stability of the coastline (erosion and accretion), and the viability of renewable or non renewable natural resources.
2. Problems linked to effects of natural phenomena on human settlements (flood, erosion, subsidence, cyclones, tidal waves).
3. Problems linked to the interaction between the multiple coastal activities (conflicting coastal occupations, contradictory uses, and discordant regulations) (figure 3).

In implementing an ICZM program in such a problematic context, a list of specific issues emerges from past experiences:

1. *Issues linked to information, in terms of collection, analysis, management, sharing and disclosure*. Information is one of the key elements on which an ICZM process is established. Its availability and reliability are fundamental throughout the ICZM process. It is essential for the initiation of an ICZM initiative, and, in particular, for those activities related to awareness development, public participation, understanding of the problem to solve, and for an analysis of the situation. Information can generally be derived from rough data using data management systems, like the geographical information systems (GIS) able to store, manipulate and represent data giving spatial description of the main biological, physical, socio-economical, legal and institutional features of the studied coastal area.

2. *Issues linked to the institutional context.* Laws provide the legal context within which coastal actors operate. Law can be a facilitating and incentive factor or even a limiting factor for the ICZM process development. Legislation is fundamental and has an impact on all the phases of the procedure (EUCC, 1999). ICZM requires a clear understanding of the legal arrangements governing coastal management procedures and an appropriate legal mechanism for its implementation (Scialabba, N. 1998).

3. *Issues linked to the socio-economic context*. Two aspects are particularly relevant: public participation and collaboration amongst stakeholders. Public involvement through participatory approaches is central to the success of the process. Participation is vital in order to gain an understanding of the public's priorities for the decision making process that governs coastal activities. On the other hand, the involvement and the collaboration of the

stakeholders and of all the coastal actors is essential in order to agree upon common objectives. A shared vision should be developed for different levels of government including local actors and in different sectoral branches of the administration (EC, 1999).

4. *Issues linked to the effectiveness of the process*. ICZM is typically a cyclical process, which requires periodical evaluation, and assessment of its effectiveness. Efforts to improve the process and to provide feedback are an integrative part of ICZM. According to the European Code of Conduct for Coastal Zones (EUCC, 1999), that includes the evaluation of the following factors:
   - Level of coordination,
   - Public participation,
   - Existence of a coherent data collection,
   - Existence of supporting activities,
   - Availability of relevant information,
   - Efficiency of Decision-Making.

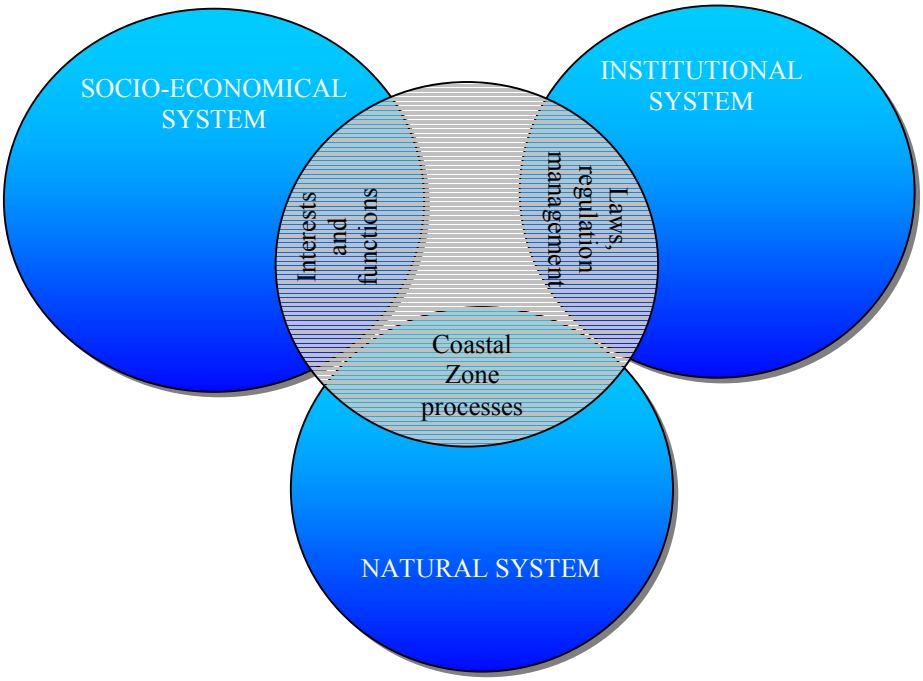


Figure 3: ICZM at the centre of natural and human interactions (adapted from Klomp. R, 1993)

4. The ICZM procedure

The setting up of ICZM plans is a complex task, which requires time and willingness. In addition some prerequisites for an effective ICZM are considered essential for a good start and the success of the implementation. These include the existence of:

1. political will and initial leadership to co-ordinate the launching of the process;
2. public awareness;
3. legal and administrative capacities to develop and carry out coastal plans;
4. technical capacities and human skills;
5. instruments for human resources management and information collection;
6. adequate financial resources.

Efforts should be made to fulfil as many of these conditions as possible; nevertheless experience has shown that the process can be initiated even with an incomplete set of conditions (UNEP,1995).

It emerged from the literature, that some stages and steps are common to the majority of integrated coastal management procedures. The general structure includes five main stages: (1) inception, (2) problem identification (3) planning, (4) implementation, and (5) evaluation. An iterative cycle of activities outputs, decisions, and feedback is formed (figure 4). The process is expected to be continuous, and there is no end point after which the process is considered complete. Links between component phases should allow retroaction mechanisms and the timely correction of activities (UNEP, 1995). A detailed description of these five stages follows below.

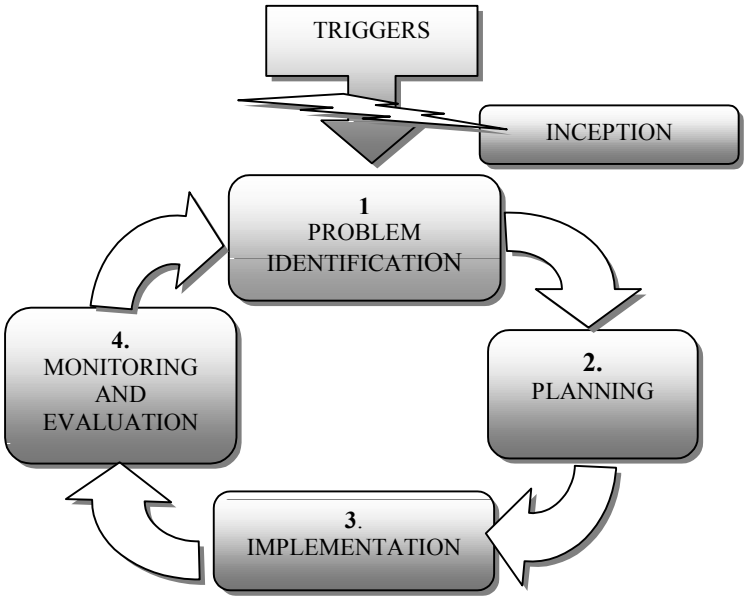


Figure 4: Main stages of the ICZM process

4.1. Inception

ICZM requires an institutional and political decision to start, which is triggered by one or the combination of several factors, including:

- past decisions which have caused degradation processes and conflicts;
- recent decisions and incentive measures (for example some international directives);
- specific issues rising from changing coastal processes (for example depletion of resources or an increase in pollution);
- local awareness of communities, authorities and groups with the willingness to act (WCC, 1993; UNEP, 1995);
- desire to increase the economic benefits obtained from the coastal zone (Cicin-Sain and Knecht 1998).

These factors can generally encourage or catalyse political will and a formal decision. Triggers generally vary from one case to another, and with relation to the economic and environmental context. According to Cicin-Sain and Knecht (1998), ICZM catalysts are closely linked to the level of economic development and the severity of environmental problems.

The inception phase provides all of the elements necessary for the decision initiating a process, to be taken. A formal document must be drawn up and elaborated in collaboration with all concerned

actors. The document should contain a feasibility study and a work-plan, including the identification and the analysis of:

1. the prerequisites and triggering factors;
2. the need to implement an ICZM process and the related objectives;
3. the temporary boundaries of the study area;
4. the stakeholders and actors from government and non-governmental institutions involved in the use of coastal resources (stakeholder analysis);
5. a time table;
6. the available financial resources.

In this stage, it is necessary to define individuals and entities responsible for the leadership. In most cases, the leadership is represented by the highest level of responsibility. In some cases the establishment of a steering committee with representatives of different interests is required to guide and co-ordinate the process. Cicin-Sain and Knecht (1998) note in their cross-national survey, that the majority of respondents (73 percent of all responses) indicated that the initiative was a "national-level government initiative" implying a top-down procedure. Nevertheless, bottom-up approaches have also produces beneficial results in regions (particularly in subsidence economies) where local groups are more willing to act (WCC,1993). It was recently argued that benefits produced by local level initiatives are even more likely to create long term support for ICZM (Power, *et al* 2000). In both approaches, the intrinsic nature of ICZM requires the active participation of local actors and communities and the co-operation of national and local levels of governance.

It is important that the leading body of the ICZM procedure carry out an accurate stakeholder analysis. This analysis is designed to identify all organisations and individuals who have management responsibilities in the coastal zone, or have the power to influence the decision making process, or could have a role in the implementation of decisions, or, finally, will be affected by the resulting management activities.

4.2. Identification of problems

This stage is designed to prepare for the planning process and for the elaboration of proposals and action plans in order to be submitted to decision-makers. It is often included in the planning phase as a preliminary stage (UNEP, 1995). It is considered separately here because it is a fundamental step on which the spatial context of the study, the choice of parameters to consider and the orientations of the decisions envisaged, depend (Henocque *et al*, 1997). The pattern of activities and process interactions are generally complex, and the issues to be addressed which require ICZM plans can be numerous. The task of identifying major sectoral issues and their implications generally requires an analysis of the available information, and can be tackled by carrying out an environmental audit or ***Coastal Diagnosis*** (CD). The coastal diagnosis refers to an analytical approach to the interactions between human and environmental systems which is generally described within a driving forces-pressures-states-impact-response framework (DPSIR) such as the DPISR approach of the European Environmental Agency (EEA, 1999)[3] The CD contributes to the better understanding of the interactions and links between human activities and natural processes, which originate different types of resource utilisation. The diagnosis should compile the available data, analyse existing information and include a literature review, and, possibly, the elaboration of interviews and questionnaires to be filled in by local communities and experts. In addition the CD

[3] This system of analysis expressed the complex human-environment relationship in a simple, causal way, providing an understandable structure within which available knowledge can best be organised and analysed and decision making supported (Swart and Bakkes, 1995).

must allow an evaluation of the magnitude of problems and their implications, and should facilitate the identification of the problems to be solved in priority.

The definition of priorities is an important step that refers to a process of negotiation that requires the involvement of concerned actors (public, administration) and the use of some techniques of analysis. Generally all issues cannot be addressed at the same time, the selection process will help to focus on the major issues.

The definition of priorities can be performed with an analysis based on some criteria of choice which vary from area to area according to needs, issues and governmental systems. The table 1 shows an example of criterion that can be used (Henocques *et al,* 1997).

Type of criterion	Criterion
Geographical dimension of the problem	Km of coastline affected
Social implications	Number of people affected
	Loss of income
Ecosystem implications	Destruction of habitat

Table 1: Example of criterion of choice

The coastal diagnosis should provide the required elements for the elaboration of a guiding programme: a problem oriented document which aims to precede and confirm the decision to continue the ICZM process. This programme must include:

1. the precise delimitation and definition of the concerned area (boundaries and zoning methodologies);
2. the identification of the main problems of the area and the problems to solve in order of priority;
3. the identification of information gaps;
4. a proposal for the preparation of an integrated coastal master plan;
5. an analysis of legal requirements posed by the proposal (need of new legislation, or need of modification);
6. an analysis of the financial requirements for the implementation.

4.3. Planning

The planning phase aims at elaborating a set of policies, programmes and a set of action plans. In particular three steps are necessary:

1. Surveys and scenario analysis;
2. Definition of objectives and strategies;
3. Elaboration of an integrated action plan.

Once the decision to initiate an ICZM process has been made, the first step of the planning phase requires new data that can be gathered by means of news surveys and inquiries. These ***surveys*** are oriented towards selected problems in order to generate new data and to fill as much as possible the information gaps. The objective is to with the aim of provide the analytical bases for the definition of precise objectives and the elaboration of strategies and action plans. In addition information is made available for the analysis of current trends and for elaborating hypotheses of future impacts of human and natural pressures on the environment. The hypotheses of future prospects are the bases for the development of future ***scenarios***, which should take into account the diverse opportunities

and modes of development for the coastal zone, and the objectives of sustainability. The most appropriate scenarios can then be selected (e.g. business as usual, pessimistic, etc.).

Within the context of coastal management, problems are often poorly structured and objectives unclear or badly formulated. The clear definition of ***objectives*** is a fundamental task upon which the structure and the orientation of the process are dependent. In this phase, the involvement of the public is of great importance. The objectives can be sectoral and trans-sectoral and should be selected, classified and organised into a hierarchy in relation to the priorities. Objectives can be made quantifiable by formulating sub-objectives with accompanying criteria (indicators for reaching an objective).
The objectives must be converted into policies for integrated management. These policies can be elaborated through diverse alternative ***strategies*** including legal requirements, financial implications and institutional arrangements. The strategies involve a set of actions designed to achieve the pre-selected objectives. An analysis of the impact of the strategies should be carried out. Next, strategies should be compared and ranked. One strategy should be selected with the goal to be presented to decision-makers in a provisional document. This document can be a strategic plan and must contain information elaborated as criterions and indicators relevant for decision making and the adoption of the strategy.

In order to prepare for the application of the pre-selected management strategies, a comprehensive and detailed plan should be prepared to offer broad perspective and long-term solutions which include short term objectives and corresponding projects. The plan should support decision-making and define the procedures in detail (legal, institutional, and financial) and the operational actions to be implemented. The plan should be realistic and in accordance with the importance of problems, existing management capacities, and human and financial resources.
An ***integrated action plan*** for the management of a coastal area should be designed to:

- describe the institutional context in which the plan should be implemented;
- define the political aspects of the plan in relation to the legal context, and the legal status;
- identify the actors and entities which must have a role and which should be involved in the implementation process;
- clearly define the execution steps required;
- define the instruments involved in the implementation;
- define the approbation procedure for the plan and for periodical revision;
- identify the financial aspects (constraints and support);
- identify the time perspective of the plan.

4.4. Execution

The execution stage involves an operational decision making including:

1. the implementation of the integrated action plan, and
2. the monitoring and evaluation of the process.

The ***implementation*** will put the action plan into effect by adopting the elaborated proposals and integrating them into the existing institutional structure of the appropriate decision level. One of the crucial dimensions of the action plan is its legal status upon which the success of the implementation process depends. In fact, implementing ICZM plan may involve:

- changing the way existing institutions operate (improving linkage between them);
- creating new institutions;
- changing the rights of users of coastal resources;
- introducing new mechanisms to regulate human activities within, or that may affect, coastal areas (Scialabba, 1998).

Even if experience has shown that it is more effective to use existing institutions and arrangements when possible (Government of South Africa, 1998), the naming of an entity or an organism, in charge of co-ordinating the implementation of the plan is often necessary. This responsibility could be held by a steering committee, which could be established at the launch of the project, and which could be composed of people representative of all actors and interest groups. In fact, the set up of the plan can often create new conflicts between stakeholders.

Monitoring, in this case, can be defined as the periodic re-measurement of appropriate parameters to determine the effects of particular management strategies or policies, and the response of systems to changes in the wider environment (Bosch *et al.,* 1996). From the inception of the process, monitoring mechanisms should be set up providing process feedback and information flows that allow the possibility to modify and improve the process continuously.
The set of stages, steps and actions generally involved in the ICZM procedure, are shown in the figure reportend in the following page.

Evaluation procedures should be conducted at various stages to assess the progress of the process. Monitoring activities for ICZM are often complex and require the control of many factors and variables related to the following evaluation criteria:

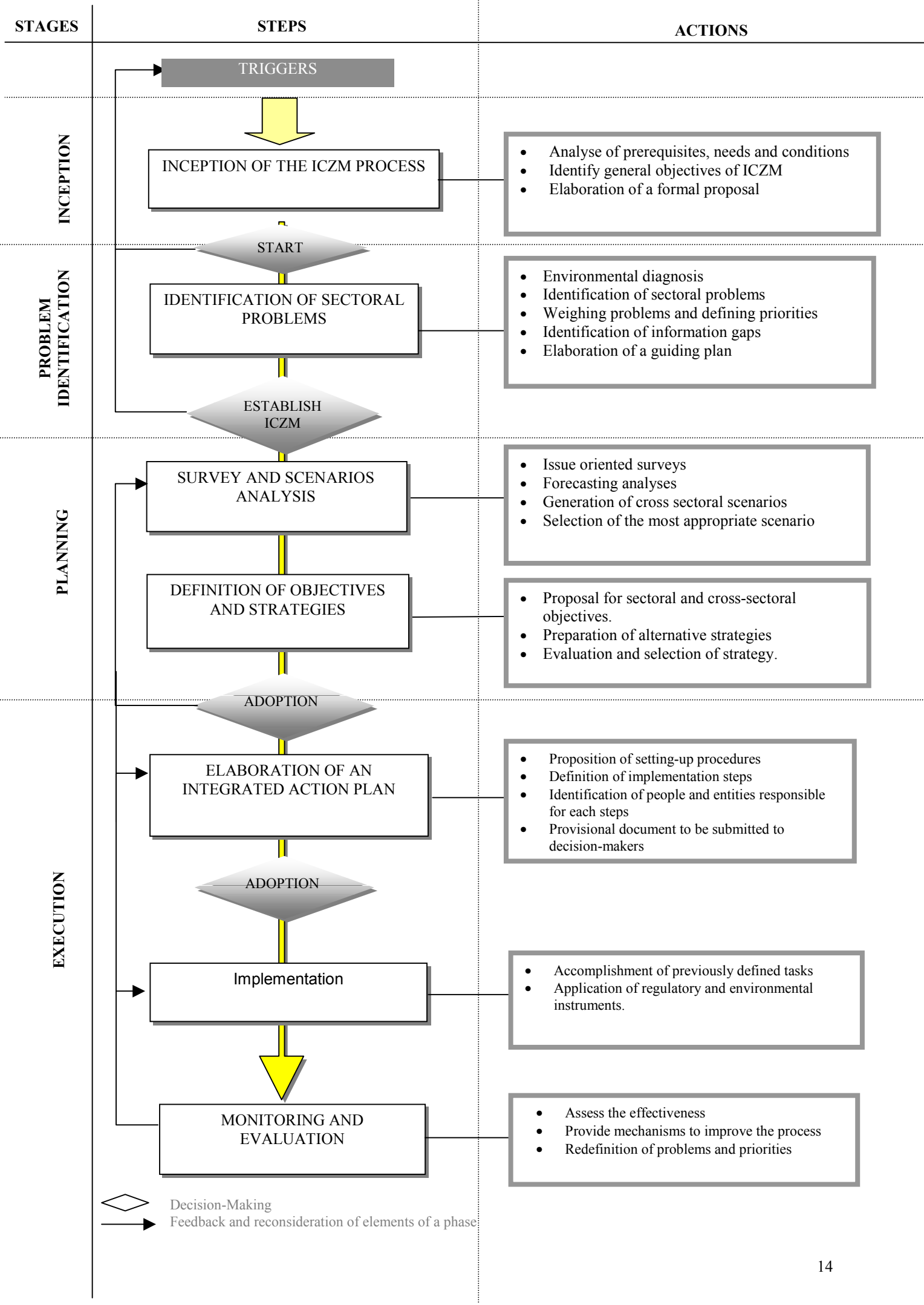
- results and benefits obtained with respect to the objectives;
- performance of ICZM policies that have been implemented;
- efficiency of decisions;
- efficiency of financial investments;
- equity of the generated benefits;
- impacts of actions on the environment.

In practice, a monitoring and evaluation system should be established focusing on key indicators related to the above criteria and according to the DPSIR model. Such indicators can also be linked to a GIS in order to display the spatial change in the area in an attractive form.

5. Concluding remarks: ICZM potentials for the Venetian area

ICZM represents the opportunity of dealing with multiple and interconnected issues that reflect the coastal systems dynamic. As seen before, the general ICZM model is designed to bring all coastal sectors, levels of government and coastal users into a rational goal-setting and decision making framework. A successful ICZM programme adjusted to a specific context will incorporate the system of governance, culture and tradition, people needs and expectations into its structure, and will be built as much as possible on existing organisation and arrangements.

The examination of the ICZM theory and applications described in international literature confirms the potentials of such a methodological approach to support new planning and management strategies designed for the sustainable development of the so-called Venetian Lagoon System (VLS). The VLS is an extremely complex territorial context in which cultural, social and environmental features of international relevance coexist. The multiplicity of activities places different demands on coastal resources, resulting in intense competition and conflicts over appropriate patterns of use. Historical and recent examples of success and failure in dealing with these issues have characterised attempts from Venetian institutions to manage and plan multi-sectoral uses of local resources (i.e. touristic exploitation of historic settlements, fish farming, industrial development, etc.).


STAGES
STEPS
ACTIONS
TRIGGERS
INCEPTION
INCEPTION OF THE ICZM PROCESS
Analyse of prerequisites, needs and conditions
Identify general objectives of ICZM
Elaboration of a formal proposal
START
PROBLEM IDENTIFICATION
IDENTIFICATION OF SECTORAL PROBLEMS
Environmental diagnosis
Identification of sectoral problems
Weighing problems and defining priorities
Identification of information gaps
Elaboration of a guiding plan
ESTABLISH ICZM
PLANNING
SURVEY AND SCENARIOS ANALYSIS
Issue oriented surveys
Forecasting analyses
Generation of cross sectoral scenarios
Selection of the most appropriate scenario
DEFINITION OF OBJECTIVES AND STRATEGIES
Proposal for sectoral and cross-sectoral objectives.
Preparation of alternative strategies
Evaluation and selection of strategy.
ADOPTION
EXECUTION
ELABORATION OF AN INTEGRATED ACTION PLAN
Proposition of setting-up procedures
Definition of implementation steps
Identification of people and entities responsible for each steps
Provisional document to be submitted to decision-makers
ADOPTION
Implementation
Accomplishment of previously defined tasks
Application of regulatory and environmental instruments.
MONITORING AND EVALUATION
Assess the effectiveness
Provide mechanisms to improve the process
Redefinition of problems and priorities
Decision-Making
Feedback and reconsideration of elements of a phase

The recent "Torcello case" is emblematic of the conflicts which can occur in coastal zones, and of public reaction to administrative decisions and more widely to top-down planning decisions. In this case, the interventions designed for the morphological and environmental safeguarding of the Torcello island resulted in significant public opposition, which eventually caused the works to stop and be re-designed. This interruption caused significant negative effects in terms of delaying the solutions to problems of morphological and environmental safeguarding, and increasing the cost of the interventions. An analysis of these events illustrated that there is a substantial ***lack in co-ordination*** among the various administrations in charge of planning and management at various scales and for different sectors. In particular, state and municipal administrations, agencies in charge of local planning and those dealing with public works are concerned. Moreover, the original planning did not include a ***participatory process*** or an approach integrating an assessment of ***public opinion***. Finally, one of the criticisms of the project of public works for the Torcello island was that sectoral issues were analysed individually within a single engineering project, rather than following an ***holistic approach*** in which issues are assessed with a broader vision allowing the definition of alternatives.

In the Venetian context, the potentials of Integrated Coastal Zone Management can be easily seen. ICZM would offer positive contributions to:

- an integrated vision of both planning and management problems, and
- a cross-sectoral participatory approach for the resolution of local issues (at various scales) and day-to-day citizen problems in Venice's coastal area.

The ICZM procedure described in the paper represents a methodological background upon which a concrete proposal for the Venetian area could be designed.
Further research efforts should be oriented towards:

- acquiring an in-depth understanding of the complex multi-level ***institutional and decisional context*** in order to be able to identify an effective strategy to launch the ICZM process;
- identifying the most suitable approaches to overcome problems in ***co-ordinating administrations and competencies***;
- acquiring an in-depth understanding of the ICZM potentials at the various levels of interventions and, in particular understanding the relationship between ***planning strategies***, on larger scales, and ***project design and realisation***, on smaller ones;
- identifying the best solution for implementing an effective ***participatory approach in decision making***;
- tailoring the methodological background to the specific requirements as identified with the above mentioned studies, to propose a ***specific and effective methodological proposal of the Venetian area***.

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